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On transport and other infrastructure knitting regions together

Frank Witlox

Introduction – a scaling issue

This contribution explores how transport, transport links and other types of infrastructure knit regions together. Nodes, links and relations, which can be considered at a global, regional and local scale, play a vital role in this respect.

At the global scale, relations revolve around investment, trade and production. Changes in global values, for example, affect the way production systems are organised. Air lanes and maritime shipping lanes function as links between gateways and hubs, airports and ports.

At the regional scale, urban systems and the hinterland take centre stage. At this scale, corridors like rail lines, highways and canals represent the links, connecting the nodes at this level, the cities.

Issues related to commuting and the distribution of goods represent the transport-related effects at the local level. The roads and transit systems accommodating commuting and distribution connect the vital nodes for employment and commercial activities.

The global, regional and local scales interact. While the focus is often on the regional level, with its cities, urban systems and hinterland, this level cannot be isolated from the global or

the local scale. Links identified at these scales may affect the regional scale, and vice versa. As a result, the analysis is rather complex.

(Figure 1 - PPpresentation slide 2)

Another, more traditional way of investigating the scaling issue is to examine site and situation, two core concepts in the field of urban geography[1]. These concepts can be integrated in an approach that focuses on city centres, surrounded by city-regions. Within this conceptual frame, local, regional and global levels interact as well. This approach also underscores important aspects related to the site, such as its physical characteristics, its infrastructure and its economic character. These also play a part on several levels.

Spatial planning at the regional level: concepts of multicentricity and polycentricity

The literature about regional spatial planning features concepts such as multicentricity (the presence of multiple centres) and polycentricity (a balanced constellation of a multitude of cities or centres). To distinguish between polycentricity and monocentricity, the relative importance of the cities or centres must be measured. In a morphological approach, the absolute importance or the nodality of the centres is identified. Straightforward parameters are employment rates and or population statistics, which can be considered as indicators of a centre's absolute importance.

The Globalization and World Cities Research Network (GaWC) focuses on relational importance, by investigating the centrality of cities. The data used here are relational rather than static. Hence, connectivity plays an important role in data collection and analysis. While commuting patterns may be an important pointer in this respect, a global scale analysis of relations requires other flows to be examined as well.

Figure 2 shows how Burger and Meijers (2010) initially distinguish between multicentricity and polycentricity. They argue that polycentricity, apart from the obvious existence of multiple centres, also implies a certain balance in the importance of these centres.[2] Opinions differ on how the importance of centres can and should be measured. In general,

polycentricity is analysed either in terms of the absolute importance (the nodality) of centres or in terms of the relative importance (the centrality) of the centres.

(Figure 2 - PPpresentation slide 6)

The former approach, referred to as morphological polycentricity, relies on static attributes, such as employment and population figures, to quantify a city's importance. Functional polycentricity, on the other hand, uses relational data, e.g. commuting patterns, numbers of shopping trips or flows of knowledge.[3]

Polycentricity and flow patterns

In recent research by Hanssens et al. the functional polycentricity of the mega-city region in central Belgium is assessed, based on advanced producer service (APS) transaction links. Rather than measuring centrality in terms of connectivity to corporate networks of APS firms, the authors focus on the relative importance of APS provision to large companies. As the data required for this type of transaction link analysis are not readily available, information on APS procurement had to be collected. Between 7 June and 22 November 2009, a questionnaire was sent to the 300 largest Belgium-based companies. They were asked to identify and locate their main business partners for accountancy, advertising, banking or finance, insurance, law, management consultancy and information communication technology. Based on the answers from 97 completed surveys, simple diagrams were produced, showing a strong concentration of business activities in Brussels, where most of the 300 companies in the survey were located. These companies placed high importance on proximity, mostly relying on other Brussels-based firms.

(Figure 3 - PPpresentation slide 10)

In the cartogram, the frame indicates the mega-city region. Transaction links between mega-cities are represented by black arrows, while the grey arrows depict transaction links with or between Belgian cities outside the mega-city region. The linguistic border between the Flemish and the Walloon regions is also indicated. The orientation of the arrows corresponds to the direction of the service supply (from service city to user city). The borders around the city names indicate the presence of intra-city links.

The cartogram illustrates the links between Brussels and Antwerp, Brussels and Ghent and those between Antwerp and Ghent. It also shows that some links cross the linguistic border. Similar data are available at both the regional and the national scale. At these levels, more cities engage in various interactions. The links between major cities and smaller scale places like Geel and Turnhout demonstrate the concept of connections and flows between several cities.

Polycentricity and mobility patterns

Is polycentricity, with its implications on mobility and transport, a virtuous or a vicious feature? Several sources claim that the evolution towards polycentric regions benefits commuting. Others, however, claim the opposite. The co-location hypothesis postulates that an increase in polycentric regions will lead to a closer proximity of work and home. This closer proximity may reduce travel distances and commuting, which should benefit sustainability. Polycentricity favours the cost-effectiveness and competitiveness of mass transport, reducing the reliance on less sustainable private transport. Some sources argue that, when regions evolve from monocentric into polycentric areas, this may lead to a decrease in public transport use, and thus to disinvestment. An effective public transport system requires high volumes and a concentration of jobs. Therefore it is easier to establish a public transport system that connects monocentric cities.

Polycentricity is considered to be the prime planning tool for enhancing cities' competitiveness, social cohesion and environmental sustainability[4]. According to Hickman and Banister (2007), polycentricity involves more than competitiveness and sustainability[5]. Issues of dispersion, mixed land use, size, density, accessibility, design and diversity are at stake, as well as many others. The general keywords are networks, nodes and demand.

Figure 4 shows a set of relationships between nodes, networks and demand. The demand for the movement of people, freight and information is a derived function of a variety of socioeconomic activities. Nodes are the locations where movements originate, end or are transferred. The concept of nodes varies according to the geographical scale being considered, ranging from the local to the global. Networks are composed of sets of linkages derived from transport infrastructure. Terminals link the nodes and the networks, while the

flows show how the demand ties into the network. Locations connect the demand to the nodes. As such, the three keywords intertwine.

(Figure 4 - PPpresentation slide 13)

Polycentricity in practice

The European CIVITAS initiative helps cities to achieve a more sustainable, clean and energy-efficient urban transport system by implementing and evaluating an ambitious, integrated set of technological and policy-based measures. Eight measure categories have been identified as the basic building blocks of an integrated strategy: clean fuel and vehicles, integrated pricing policies, a less car-intensive lifestyle, collective passenger transport, restriction of access, transport of urban goods, soft measures and transport management. Each CIVITAS city chooses an appropriate set of measures from those building blocks and combines them to form integrated solutions for clean urban transport in cities. In addition, it puts in place the appropriate planning framework, ensures political involvement and support and establishes the necessary partnerships to ensure delivery of the plans.

The aim is to create a vision on the development of a multimodal transport system that integrates all geographical scales, from the global to the local. With the development of the new modal and intermodal infrastructures, urban regions are increasingly gaining access to the international market. Several parameters of regional transportation have been transformed or at least significantly modified. Figure 5 represents the regulation of movements for a corridor within a multimodal transportation system. The system is composed of a set of competing hub centres where regional and local transportation networks converge. The regulation of flows is coordinated at the local level by distribution centres, commonly composed of a single transport terminal. At the global level, it is coordinated by articulation points composed of major transport terminals and related activities. In any of the articulation points, modal and intermodal functions can converge, particularly if the articulation point is the interface between several modes. The regional multimodal network converges at major articulation points, allowing linkages with the international transportation system through transport interfaces.

(Figure 5 - PPpresentation slide 17)

Conclusion

Spatial planning requires a sensible integration and implementation of different policy domains at the regional level. A continuous monitoring system is needed to evaluate the success of the implementation and if it is found to be off course, the authorities must be prepared to intervene and take the necessary measures before programme completion.

Sensible integration refers to the involvement of various sectors such as housing and mobility, several scales and different objectives. Focusing on transport means investigating the location of people, their homes, their work and commuting patterns and many other aspects. Planning specialists from all these fields should interact, taking into account each geographical scale. Furthermore, smart, innovative models should not only aim for sustainability but also for liveability. Rather than project 50 years ahead, models must also focus on the present and the near future.

As good planning practices require the support and cooperation of all stakeholders and key players, they should be involved before the final project stages, in order to exploit the benefits of bundling. They should also be provided with sufficient time to evaluate proposals and formulate their feedback. However, involving many parties from the first stages onwards may have a stifling effect. The challenge is in developing a lean, efficient and effective decision-making process.

Notes

1. Pacione, M. (2003) Urban Geography. A Global Perspective. New York: Routledge.

2. Burger M.J. and Meijers E.J. (2010) Form follows function? Linking morphological and functional polycentricity. GaWC Research Bulletin 344. Available from http://www.lboro.ac.uk/gawc/.

3. Hanssens, H., Derudder, B., Van Aelst, S. and Witlox, F. (2011) Assessing the functional polycentricity of the mega-city region of central Belgium based on advanced producer service transaction links. Regional Studies (submitted).

4. Davoudi, S. (2003) European briefing: polycentricity in European spatial planning: from an analytical tool to a normative agenda. European Planning Studies, 11, 979–999.

5. Hickman, R. and Banister, D. (2007) Transport and reduced energy consumption: what role can urban planning play? Transport Studies Unit (Ref. 1026). Oxford: Oxford University Centre for the Environment.

6. Rodrigue, J-P., Comtois, C. and Slack, B. (2009) The Geography of Transport Systems. 2nd edn. New York: Routledge.

Biography

Frank Witlox holds a PhD in Urban Planning from the Eindhoven University of Technology, a Master's Degree in Applied Economics and a Master's Degree in Maritime Sciences, both from the University of Antwerp. Currently, he is Professor of Economic Geography at the Department of Geography of the Ghent University. He is also a visiting professor at the University of Antwerp (Institute of Transport and Maritime Management Antwerp), where he teaches warehouse and hinterland distribution management and an Associate Director of Globalization and World Cities at Loughborough University. Since 2010, he has been the Director of the Doctoral School of Natural Sciences, Ghent University. His research focuses on transport economics and geography, economic geography, spatial modelling techniques, (city) logistics and world cities and globalization.

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Figure captions

Figure 1: Scales of spatial organization of transport

Figure 2: Morphological polycentricity versus functional polycentricity

Figure 3: Geography of transaction links at the regional and national scale

Figure 4: The transport system

Figure 5: The multimodal transport system